

WE CLAIM:

1. A cross-linkable or cross-linked rubber composition which is usable for constituting a tire tread, comprising:
  - an elastomeric matrix comprising at least one diene elastomer which comprises a carboxylic acid function at one or at each of its two chain ends, and
  - a reinforcing filler comprising a reinforcing inorganic filler,wherein said diene elastomer has a molecular weight which is greater than 80,000 g/mol, and comprises a majority quantity in said elastomeric matrix.
2. The cross-linkable or cross-linked rubber composition of Claim 1, wherein said diene elastomer is selected from the group consisting of a butadiene/styrene copolymer and a butadiene/styrene/isoprene copolymer.
3. The cross-linkable or cross-linked rubber composition of Claim 1 wherein said reinforcing inorganic filler comprises a quantity equal to or greater than 40 phr (parts by weight per hundred parts of diene elastomer(s)).
4. The cross-linkable or cross-linked rubber composition of Claim 3 wherein said reinforcing inorganic filler comprises a mass fraction greater than 50% of the reinforcing filler.
5. The cross-linkable or cross-linked rubber composition of Claim 1, wherein said reinforcing inorganic filler comprises silica.
6. The cross-linkable or cross-linked rubber composition of Claim 4, wherein said reinforcing inorganic filler comprises silica.

7. The cross-linkable or cross-linked rubber composition of Claim 1, wherein said reinforcing inorganic filler comprises carbon black that is surface-modified by silica.

8. The cross-linkable or cross-linked rubber composition of Claim 1, further comprising a reinforcing inorganic filler/diene elastomer bonding agent.

9. A process for the preparation of a cross-linked rubber composition, said rubber composition comprising:

- an elastomeric matrix comprising at least one diene elastomer having a carboxylic acid function at one or at each of its two chain ends, and

- a reinforcing filler comprising a reinforcing inorganic filler, wherein said diene elastomer has a molecular weight greater than 80,000 g/mol, and said elastomeric matrix comprises a majority of said diene elastomer

said process comprising:

thermomechanically working the constituents of the composition with the exception of a cross-linking system in a first phase at a maximum temperature of between 130° and 200°C,

said first phase comprising:

- (a) mixing the composition constituents, with the exception of the antioxidant, with all the zinc monoxide to activate cross-linking and

- (b) mixing the product of (a) with an antioxidant and with no zinc monoxide,

and in a second phase, mechanically working the product of the first phase together with the cross-linking system at a temperature of less than that of the first phase.

10. A tread for a tire, comprising the rubber composition of Claim 1.
11. A tire tread according to Claim 9, wherein said tire tread is formed of said rubber composition.
12. A tire having reduced rolling resistance, comprising the tread according to Claim 10.
13. A tire having reduced rolling resistance, comprising the tread according to Claim 11.